

# PhysicsWorld



OCTOBER 2001

[physicsweb.org](http://physicsweb.org)

VOLUME 14 NO 10

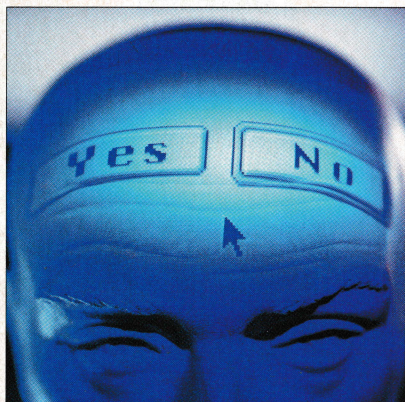
## Going places

Career options for physicists

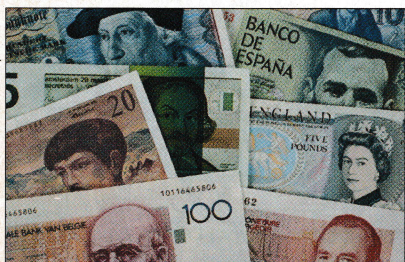
What's your philosophy? **Anthropic principles** Fresh ideas for physics degrees



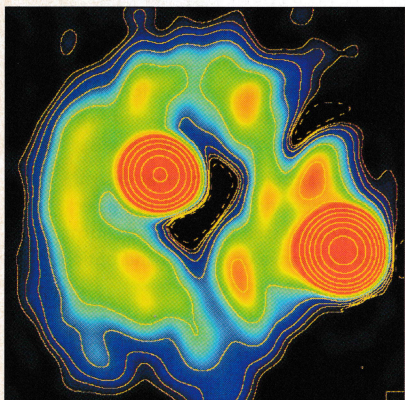
# PhysicsWorld



Philosophy – it's make your mind up time **18**



Money, money, money – salaries reviewed **59**



Constant change – universal variations **26–27**

## Cover

Going places: career options for physicists **31–52**

(Tony Stone)

What's your philosophy? **18**

Anthropic principles **23–25**

Fresh ideas for physics degrees **5**

*Physics World* is published monthly as twelve issues per annual volume by Institute of Physics Publishing Ltd, Dirac House, Temple Back, Bristol BS1 6BE, UK

### United States Postal Identification Statement

*Physics World* (ISSN 0953-8585) is published monthly for \$315 per year within the United States.

Periodicals postage paid at Melville, NY, and additional mailing offices.

POSTMASTER: Send address changes to *Physics World*, American Institute of Physics, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502.

## 3 POST-DEADLINE

Lasers claim Kapitza–Dirac first, the magnetic attraction of learning, bigger buckyballs boost superconductivity

## 5 NEWS AND ANALYSIS

Report highlights challenges for undergraduate physics, chance breakthrough in gallium-arsenide manufacture, new route for laser fusion, astronomers make case for giant new telescope, Doyne Farmer: using physics to beat the stock market, Fred Hoyle: controversial and creative astrophysicist

## COMMENT

### 15 EDITORIAL

A degree for change, philosophy for all

### 16 FORUM

Making physics more attractive *Mick Brown*

### 18 CRITICAL POINT

What's your philosophy? *Robert P Crease*

### 19 LETTERS

Changing constants, why FORTRAN is far from finished, is *Physics World* for cranks?

## 23 PHYSICS IN ACTION

Anthropic views of life and the cosmos, the constants are not what they used to be, on the dot: atomic clocks, biological physics hits the high life

## 31 CAREER OPTIONS FOR PHYSICISTS

- From physics to computing *Eugene Loh*
- Applying science to electronics *Emma Walton*
- A career in the defence industry *Jennifer Morrison*
- What it's like to teach physics *Kate Searle*
- Love and the two-body problem *Valerie Jamieson*
- Students must turn to soft skills *Matin Durrani*
- So just how good is your salary? *Edwin Cartlidge*
- Sun, sea and Spanish science *Danny Hill*
- Jobs in publishing and the media *Matin Durrani*
- Healthy prospects in medical physics *John Kotre*
- Finance: not all rocket science *Jörg Tutas*
- How to get the job you really want *Valerie Jamieson*
- Changing your career direction *Matin Durrani*
- Is there life for you after work? *Dennis Hill*
- Have physics degree – will try anything *Peter Rodgers*

## 55 REVIEWS

Newton's gift to physics, the marvels of materials, science and politics in Washington

## 59 INSTITUTE MATTERS

The Institute of Physics salary survey *Edwin Cartlidge*

Physics.org makes it debut, calling all students

## 66 RECRUITMENT

- Graduate recruitment

## 80 LATERAL THOUGHTS

Selling philosophy *Stephen Jenkins*



## CAREERS

# Magazine firing backfires

Almost 600 American physicists have signed an open letter calling for the reinstatement of Jeff Schmidt to his position as a staff editor on *Physics Today*, the monthly magazine published by the American Institute of Physics (AIP). Schmidt was fired in May last year, soon after his book *Disciplined Minds: A Critical Look at Salaried Professionals and the Soul-Battering System that Shapes Their Lives* had been published by Rowman & Littlefield.

The book is a highly critical look at professional life, including academic life, in modern America. In the introduction Schmidt describes how “employers’ emphasis on control and the bottom line is giving [professionals] only increased workloads, closer scrutiny by management and unprecedented anxiety about job security”. And so it proved for Schmidt, who has a PhD in physics from the University of California at Irvine.

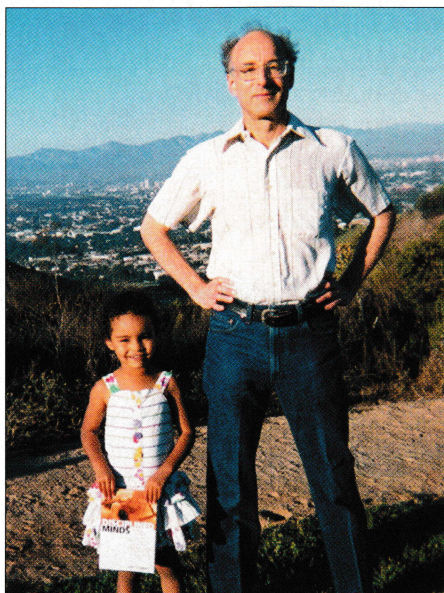
“A few days after [AIP authorities] saw the book,” he recalls, “a group of managers took me to the personnel office and told me they were firing me over the book. They escorted me out of the building like a criminal after 19 years on the job.”

What caused the dismissal? Marc Brodsky, executive director of the AIP, points to a passage in the introduction: “This book is stolen. Written in part on stolen time, that is...my job simply didn’t leave me enough energy for a major project of my own...so I began spending some office time on my own work.”

“We removed him for the statement he made that he was stealing from us: that is very close to an inflammatory statement, true or not,” Brodsky told *Physics World*. “We work on a system of tremendous trust in people. We don’t watch their hours. Stealing was in essence his own self-evaluation.”

Schmidt, who has not found a new job, later modified his comments, saying that he worked on the book during his paid half-hour break at *Physics Today*. He has also fought his dismissal, gaining some powerful allies along the way. The linguist Noam Chomsky organized an open letter, signed by 147 academics, calling on Brodsky to reconsider Schmidt’s firing, and a Washington law firm has agreed to represent Schmidt for free. Individual physicists have also written to the AIP.

Then, on 21 August this year, three physics professors – Talat Rahman of Kansas State University, George Reiter of the University of Houston, and Michael Lee of Kent State University – started to circulate a letter to Brodsky from the physics community. “While we do not necessarily agree with Jeff’s views...we believe that free debate within the physics community is healthy,” the letter states. “We urge you to



Standing firm – Jeff Schmidt and his daughter Joshua Rose with the offending book

reconsider your decision, and offer to reinstate Jeff as an editor at *Physics Today*. We ask that you publish this letter in *Physics Today*, to bring our concerns to the attention of the wider physics community.”

An accompanying note by former *Physics Today* staff members Chris Mohr and Jean Kumagai accuses the magazine’s management of using the book as a pretext to dismiss an individual they regarded as a difficult employee because, among other things, he consistently pressed for changes in workplace policies. Brodsky refuses to discuss those charges. “I am personally reluctant to make public comments about an ex-employee,” he says. He adds that *Physics Today* is unlikely to publish the letter “because the editor doesn’t think we should air our employee disputes in our publication”.

The letter was due to be delivered after *Physics World* went to press. “Hopefully it gives the AIP enough of an opportunity to review the case,” says Rahman. “It would be good to see justification for what has been done. We want due process.”

Several physicists have asked Robert Park, director of public information at the American Physical Society, why he has not written about the issue in his outspoken weekly column for the society’s Web site. “The fact of an organized campaign has made me a little leery,” says Park. Schmidt’s comment about stealing “could have been treated jocularly,” he says. “But if there had been earlier trouble with the employee, they would not have treated the statement that way.”

**Peter Gwynne**  
Boston, MA

## NUCLEAR PHYSICS

# New era for gamma rays

An accelerator in the US is to be upgraded to produce gamma rays that are one million times more powerful than any other source in the world. The High Intensity Gamma-ray Source (HIGS) at Duke University in North Carolina produces gamma rays by colliding electrons with laser photons. Thanks to a grant of \$3.2m (about £2.2m) from the Department of Energy, the source will also produce gamma rays over a much wider range of energies than before.

The source consists of a storage ring, 54 m in diameter, into which two equally spaced electron bunches are injected. A free-electron laser system stationed half way round the ring converts one bunch of electrons into an intense ultraviolet laser beam. This pulse of light reflects from a mirror, returns the way it came, and collides head-on with the other electron bunch. Through the process of “inverse Compton scattering”, the electrons boost the energy of the ultraviolet photons by a factor of some 16 million. The result: a beam of high-intensity gamma rays of well defined energy.

“It is this unique capability that is the most popular feature for nuclear physicists,” says Vladimir Litvinenko, the Duke University physicist who designed the source’s free-electron laser. “The ability to generate beams of mono-energetic gamma rays with tunable energy is critical for most of the nuclear experiments we carry out.”

Almost 100 scientists from over 30 institutions currently use the source. For example, Norbert Pietralla, a nuclear physicist from Yale University, uses it to study nuclear resonance fluorescence (NRF), which provides valuable information about nuclei – such as their parity quantum number – that is almost impossible to obtain by other means. “HIGS opens up a whole new chapter in NRF research,” says Pietralla.

Meanwhile, astronomers from the Max Planck Institute for Gamma-ray Astronomy in Mainz, Germany, want to use the HIGS facility to calibrate their Medium Energy Gamma-ray Astronomy (MEGA) telescope.

“The upgrade will allow us to perform experiments to test fundamental symmetries and provide detailed information on the mass difference between up and down quarks,” says Henry Weller, a nuclear physicist at Duke. “There is a long list of experiments lined up for HIGS,” says Litvinenko. “I can even see potential for medical and industrial applications.”

**John Moore**